TYSON (JAS.)

TREATMENT

OF

CHRONIC VALVULAR DISEASE OF THE HEART.

Read before the College of Physicians of Philadelphia.

BY

JAMES TYSON, M.D.,

Professor of Clinical Medicine in the University of Pennsylvania.

REPRINTED FROM THE THERAPEUTIC GAZETTE, APRIL 15, 1893.

DETROIT, MICH.:

GEORGE S. DAVIS, PUBLISHER.

1893.

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CHARLES A. OLIVER, M. D.
1507, LOCUST STREET,
PHILADELPHIA.

Treatment of Chronic Valvular Disease of the Heart.

SINCE there are certain points in the treatment of disease of the cardiac valves which are the same for the different orifices, I shall consider first such measures as are thus common, referring more especially to mitral and aortic disease.

In the first place, it is well known that there exist chronic valvular defects at either of these orifices which give rise to no symptoms whatever and are often accidentally discovered. From the stand-point generally conceded that such defects themselves are irremediable, it is clear that, in the absence of symptoms, medicinal treatment is quite unnecessary. On the other hand, it is a happy circumstance when the subjects of such lesions are made aware of their presence, because they are enabled so to regulate their mode of life as to prevent harmful consequences, either symptomatically or organically. Such persons should avoid overexercise and excitement. Running, or even walking rapidly, hurriedly ascending stairs, extremes of passion of all kinds, and especially of anger, should be avoided, as also exposure and irregular living. There is a second grade of

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involvement of either orifice which demands the same treatment in a more imperative manner, since its omission results in a loss of compensation, manifested by dyspnœa, palpitation, and præcordial distress, promptly relieved by the treatment above specified.

In a more advanced degree of interference with normal function, the treatment becomes different with the seat of the lesion. Let us first consider lesions of the mitral valve, and first the most common of all forms,—*mitral regurgitation*. The blood flows back into the left auricle during systole of the ventricle, at a time when all communication between these cavities should be cut off and the movement of the blood should be forward only. Averted for a time by hypertrophy of the left auricle, engorgement of the lungs ultimately results, with defective aeration of blood and consequent shortness of breath. This effect is at first counteracted by the increased effort of the right ventricle, whence its hypertrophy, with sharp accentuation of the pulmonary second sound heard at the left edge of the sternum.

So long as compensation is maintained by the supplemental action of an hypertrophied left auricle there is probably no sign of embarrassed breathing, or irregularity, or præcordial oppression, or digestive derangement; but as soon as the auricle begins to fail, the engorgement of the lungs begins, and the hypertrophy of the right ventricle comes to the rescue. And even *it* may, for a time, by the reinforcement it gives to the left auricle, effect the required compensation. But a suspension of the conditions which co-operate to help it, or a slight

yielding of its muscle to the resistance to be overcome, demands assistance. The heart-tonics, of which digitalis is the type, are the agents pre-eminent for this purpose. That they operate by directly increasing the force of the right ventricle and left auricle, and thus contribute to the compensation, can scarcely be doubted; but that they help also to make the closure of the mitral orifice more complete by forcibly increasing the contraction of the left ventricle, seems also reasonably sure, since the experiments of Ludwig and Hesse have made it so plain how this can occur. They have shown that the mechanism for closing the mitral orifice does not reside in the valve alone, but that the surrounding muscles of the ventricle have an active share, not only in floating up the valve curtains, but in reducing also the size of the opening which these valve curtains have to close. This is, of course, less applicable in chronic valvular conditions where there is stiffness from calcareous change, than where regurgitation results from simple feebleness of muscle in anæmia and after the infectious fevers.

The effect required of this class of drugs varies with the degree of obstruction to be overcome, and the doses vary accordingly. Very often the heart requires but little steadying to enable it to accomplish the desired end, and moderate doses—such as 5 minims of the tincture of digitalis once in eight hours—suffice. On the other hand, it is a mistake to give too small a dose, and too great timidity often results in failure. Doses of 15 minims of the tincture of digitalis, every three hours, and corresponding doses of the other preparations

are often necessary, and sometimes produce magical effects. The irregular and halting pulse becomes regular, the dropped beat is again taken up, the dusky lips become pink, the scanty urine is increased, the shortness of breath disappears, and calmness and quiet succeed distress and restlessness. As soon, however, as the desired effect is produced the dose should be lowered. The same principles apply to the management of the still more serious engorgements of the venous system which succeed upon tricuspid insufficiency, and produce dropsies and serous effusions. It is in the effort to drive the blood through the engorged veins that the left ventricle finally hypertrophies in this form of disease.* Its failure to accomplish this through its inherent power demands the same remedies which the right ventricle needed at an earlier stage to overcome the lung engorgement, and here it is that the large doses of cardiac stimulants are demanded.

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* At this point I may allude parenthetically to the matter of hypertrophy of the left ventricle in mitral regurgitation. It has always been somewhat a matter of conjecture as to precisely when it occurs. It is commonly said that it is the result of the hypertrophy of the left auricle reinforced by hypertrophy of the right ventricle. But while these agencies doubtless contribute to a distention of the left ventricle and tend to dilatation, it is doubtful, to my mind, whether they tend to hypertrophy. For the idea of hypertrophy implies increased resistance, and there is no increased resistance with a patulous aortic orifice and a patulous mitral orifice, and it is only when the movement of the arterial current becomes delayed by the full veins that this condition of increased power, and therefore of hypertrophy, comes into play. So that it appears to me that while distention and enlargement of the ventricle is an early result of mitral regurgitation, hypertrophy is not.

This engorgement is also relieved by the use of purgatives, and as the portal area, including the liver itself and the stomach, is especially involved, mercurial purgatives are especially indicated. Five to 10 grains of blue mass at bedtime, followed by a saline in the morning, relieve the congestion, and with it the nausea and indisposition to take food which attend it. Such remedies may be resorted to semi-occasionally. Sometimes the continuous use of small doses for a long time—say ½ to 1 grain of blue mass three times a day—are more efficient. The old-fashioned combination of calomel, squills, and digitalis—in doses of ½ grain of the first and 1 grain of the second and third three times a day, or smaller doses more frequently repeated—is sometimes most happy in its effect. Digitalis is a remedy always better intermitted to obtain its best effects, and a remedy, too, which, having once excited nausea, is thereafter badly borne. It does, however, sometimes happen that digitalis may be given continuously in moderate doses—say 5 minims three times a day—with great advantage, while its omission is followed by signs of failing compensation. It is generally recognized that digitalis produces also contraction of the arterioles, and that through this, in connection with the forcible systole, the arterial pressure is increased. This effect is desirable and useful in the early stages of mitral regurgitation, before tricuspid regurgitation and dropsy have set in. Later in the disease, however, when dropsy has set in, this effect militates against the diuretic action which is so much needed. How this may be overcome will be mentioned later.

Before leaving the subject of the heart-tonics in mitral regurgitation, it may be worth while to spend a few minutes on that of the relative value of the different preparations of digitalis. While testimony is generally favorable to the infusion as the most efficient remedy, yet, on account of convenience and accessibility, the tincture is mostly used. I have on many occasions reiterated that I was inclined to believe that the greater apparent efficiency of the infusion was partly due to the fact that it was generally given in larger doses. Thus, a tablespoonful, or ½ ounce, is not an infrequent dose of the infusion, while 10 minims, or 20 drops, of the tincture and 1 grain of the powder are not often exceeded. When it is remembered that a half-ounce of the infusion, as made by the U. S. Pharmacopœia, represents nearly three grains of the powder, or 20 minims of the tincture, one may understand why it is more efficient. Recently, however, I have thought the infusion better borne by the stomach than equivalent doses of the tincture. It may be that the cinnamon-water with which it is made has this effect.

Of remedies which may be substituted for digitalis, strophanthus should, perhaps, be first mentioned; not that it is always the best. Great expectations were excited when the results of strophanthus were first published by Fraser. It will be remembered it was reported as having all the effects of digitalis on the left ventricle without the contracting effect on the arterioles. The expectations entertained were not, however, realized by clinicians, and it soon fell into partial disuse. Recently I have

resumed the use of strophanthus in much larger doses, having given as much as 10 minims, or 20 drops, every two hours for forty-eight hours, without interruption, and with good results. It is undoubtedly better borne by the stomach than digitalis.

Caffeine is an admirable heart-tonic in mitral regurgitation. I do not give less than 3 grains at a dose, but seldom give more, every three hours. When caffeine has been given in full doses for some time it produces mental symptoms quite characteristic, consisting in hallucinations not unlike those of delirium tremens, the patient imagining there are persons, animals, and other objects about him, and he is sometimes difficult to control. They, however, cease immediately when the drug is discontinued. Another effect of caffeine, which sometimes interferes with its usefulness, is its effect in inducing insomnia.

Sparteine sulphate is another heart-tonic which I have come to value very highly, especially where a diuretic effect is desired. The dose I have come to rely upon, after a good deal of experience, is never less than ¼ grain, increased to ½ grain, three, four, and five times a day.

In the much rarer disease of simple *mitral stenosis*, compensation is even easier and longer maintained by nature's own resources than in mitral regurgitation. Here, for evident reasons, there is no tendency to dilatation or hypertrophy of the left ventricle. On the other hand, hypertrophy of the left auricle becomes a conspicuous condition, succeeded by hypertrophy of the right ventricle, for the same reason as in mitral regurgitation.

Especially easy is it to maintain compensation if the narrowing is not too great and if there is a well-preserved left auricle and a strong right ventricle. If, however, the mitral narrowing is extreme, it is plain that the pulmonary engorgement will become greater if we increase the force of the right ventricle. Much more cautious must we be, therefore, in the use of digitalis. Much more needed under these circumstances is relief to the pulmonary congestion, which in turn will relieve the right heart-tension. For the same purpose aconite is sometimes of advantage in these cases in the shape of small doses, say 1 minim or 1½ minims every two hours or every hour, watching its effect. It is possible that it is through a somewhat similar action that convallaria majalis—a remedy in which most observers have been disappointed—has been found useful by Dr. Sansom* in mitral stenosis, and also by the French school as represented by Germain Sée. By these observers it has been found diuretic, increasing the twenty-four hours' urine to 85 and even 115 ounces, reducing the pulse-rate, regulating irregularity, and improving the breathing, even when accompanied by tricuspid regurgitation. The doses given are 10 to 20 minims of the tincture three times a day, and it may with advantage be associated with caffeine, which alone sometimes acts better than digitalis. More effectual than either of these remedies to relieve pulmonary congestion is bloodletting, and repeated small

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* "The Treatment of some of the Forms of Valvular Disease of the Heart" (Lettsomian Lectures, 2d ed., with corrections, London, 1886).

bleedings are often of great advantage in this form of chronic valvular disease.

The principles governing the treatment of combined mitral regurgitation and stenosis are rather those of mitral regurgitation than of mitral stenosis.

And what shall be the treatment of *pure aortic disease?* It will be remembered that both aortic obstruction and regurgitation give rise to hypertrophy of the left ventricle, and that this is compensatory in character, for a time quite sufficient to ward off any unpleasant symptoms, and for a still longer time competent to do this when associated with a quiet life, the absence of excitement, of exposure, and of privation. Its well-marked degrees are accompanied with a powerful systolic impulse, a symptom which is of itself at times a source of great discomfort. Shall we, then, give heart-tonics which increase the force of this thumping blow? Certainly not. Shall we give aconite or veratrum viride, which slow the heart and diminish the force of its stroke? Not as a rule. But there are times when these remedies are indicated. When, as the result of over-exertion, or undue excitement, or gastric derangement, the heart is turbulently overactive, and even irregular in its rhythm, then often I have seen aconite in small doses—say 1 minim, or 2 drops, repeated every half-hour or hour, under close observation—act happily, especially when combined with bromide of potassium, say 15 grains. The tincture of veratrum viride may be given in slightly larger doses. As soon, however, as this period is past, the aconite should be omitted.

We want rather in this condition to find

remedies which will tend to maintain the integrity of the heart-muscle. Such are strychnine, iron in small doses, arsenic, and nutritious, easily assimilable food. Especially useful are well-ventilated living- and sleeping-rooms, wholesome out-door life, with moderate, deliberate muscular exercise. On the other hand, the mountain-climbing advocated by Oertel seems irrational and dangerous. Every one who has had experience knows that the high altitudes are not well borne by cardiac cases of any kind.

Such measures as these tend to ward off the next stage, for sooner or later the integrity of the muscle of the ventricle yields, dilatation is added to hypertrophy, the auricular ventricular orifice enlarges, and we have mitral regurgitation. Then the treatment becomes that for mitral disease.

The treatment of aortic regurgitation and of aortic stenosis with regurgitation is similar to that of aortic stenosis.

Treatment of Dyspnœa.—As the dyspnœa is primarily the result of deficient blood-aeration in the congested lungs, the same remedies which force the blood through these organs, and thus relieve the congestion, tend also to relieve the dyspnœa, and often do so. When the dyspnœa persists, it is frequently caused by effusions into the pleural cavity, which are most promptly and successfully removed by tapping, although a blister may also answer the purpose. Repeated tapping may be necessary. Dyspnœa not thus relieved demands an opiate, and of opiates, under these circumstances, morphine is the best. One-quarter grain at bedtime, by the mouth or hypodermi-

cally, gives unspeakable comfort. Hoffmann's anodyne will sometimes relieve the milder degrees, and should perhaps be tried first, as it is always desirable to put off the use of morphine as long as possible. Sulphonal may be tried in full doses of 15 grains.

Treatment of Dropsy.—In like manner the measures that relieve the congestion and dyspnœa tend also to relieve the dropsy, but special means are also necessary. Here it is that full doses of digitalis are especially indicated, and at close intervals, every three hours, and even every two hours. But these measures are often insufficient. And I have become satisfied, from actual and repeated experience, that an essential condition of the successful treatment of the more obdurate of the cases is the restricted ingestion of liquids. With the tissues water-logged and secretion insufficient, it is plain that copious liquid ingestion only increases the difficulty.

The principle of the Matthew Hay method is correct, but in practice it is impossible, because, with an already congested stomach, solids cannot be digested without an admixture of liquid, and further embarrassment results from the effort to dissolve them and from the presence of undigested residue. Therefore I not only omit solid food altogether, but reduce the liquid to a minimum that will sustain life,—not more than two ounces every two hours, and that only during the waking hours. To this I add the use of purgatives. While diuretics sometimes fail us, we can always secure an effect from purgatives. A daily morning dose of Epsom salts or Rochelle salts is given. Then, when action of the bowels begins, full

doses of digitalis, or caffeine, or sparteine, associated with nitro-glycerin, are almost sure to be followed by copious diuresis, and when these cases start up, it is astonishing what quantities of urine are passed. I attach much importance to the association of nitro-glycerin with digitalis at this stage. A $\frac{1}{100}$ to $\frac{1}{50}$ grain may be given as often as the digitalis and simultaneously. Elimination by the bowels and kidneys being simultaneously stimulated, the sucking up of the interstitial fluid is greatly favored and often rapidly brought about. If these measures be associated with chest-tapping, which may be required, the diuresis set up is often enormous, while the swelling rapidly declines. As diuresis is established, or hunger sets in, the quantity of milk allowed may be increased, and when the dropsy has entirely disappeared, a cautious return to solid food may be permitted.

For irregularity of the heart-action and palpitation, which are more common in mitral disease, belladonna is also a useful remedy. I have had little experience with its combination with digitalis, recommended by Da Costa, but I do know that a belladonna plaster placed over the palpitating heart is one of the most efficient agents in subduing it. Nitro-glycerin is often very useful to the same end. One $\frac{1}{100}$ grain, rapidly increased to $\frac{1}{50}$ grain, three times a day, is the proper dose. Cardiac pain is also sometimes relieved by the same remedy.

JANUARY 16, 1893.

WHOLE SERIES, VOL. XVII. No. 1. THIRD SERIES, VOL. IX.

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Therapeutic Gazette

A MONTHLY JOURNAL

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GEORGE S. DAVIS, DETROIT, MICH., U.S.A.,
OR
714 Filbert Street, Philadelphia, Pa.

Published on the Fifteenth Day of Every Month.

SUBSCRIPTION PRICE, TWO DOLLARS A YEAR.

Agent for Great Britain: Mr. H. K. LEWIS, Medical Publisher and Bookseller, 136 Gower Street, London, W. C.

Entered at the Post-Office at Philadelphia, Pa., as second class mail matter.

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